

REMARKS

Brief Discussion of the Invention

The invention involves a sample collection substrate of aerogel and/or xerogel materials bound to a support structure which is used as a solid phase microextraction (SPME) device. The xerogels and aerogels may be organic or inorganic and doped with metals or other compounds to target specific chemical analytes. The support structure may comprise stainless steel or kovar wire or glass or plastic fibers. Dipping the fiber or wire in an aerogel or xerogel precursor solution and then drying the material may form a device used for solid phase microextraction wherein the xerogel or aerogel covers the entire perimeter of one end of the fiber or wire.

The March 21, 2001 Office Action

Claims 1-3, 5, 6, 9-11, 13-15, 18 and 20 were rejected under 35 U.S.C. § 102 and claims 4, 7, 8, 12, 16, 17 and 19 were rejected under 35 U.S.C. § 103. Accompanying this response is a petition and fee for a one month extension of time.

Rejections Under 35 U.S.C. §102(b)

Claims 1, 5, 6, 9, 11, 13-15 and 20 were rejected under 35 U.S.C. §102(a) as being anticipated by Hair et al (U.S. Patent No. 5,851,947). Applicants respectfully traverse these rejections because Hair et al do not disclose "supported aerogels" as defined in Applicants application, but rather Hair et al disclose aerogels that incorporate noble metals. Applicants have amended independent claim 1 to include the limitation that

the apparatus is "constructed for solid phase microextraction". Applicants have amended independent claim 13 to include the limitation that the method form a "sample collection substrate constructed for use in a solid phase microextraction apparatus." Applicants claim a "support structure" as a material formed of glass or plastic fibers or stainless steel or kovar wire which is coated with a substrate formed of aerogel, xerogel, or combinations thereof. In column 2, lines 34-48, Hair et al state that the invention involves "the incorporation of noble metals into aerogels and xerogels." Hair et al disclose an aerogel or xerogel that form a support structure for noble metals, whereas Applicants are claiming a glass or plastic fiber or stainless steel or kovar wire that forms a support structure for aerogel or xerogel materials. Applicants respectfully submit that the type of "supported aerogel" the examiner cites from Hair et al is not of the type claimed by Applicants. Thus, the rejection under 35 U.S.C. §102(a) should be withdrawn.

Claims 1, 5, 9, 10, 13-15, 18 and 20 were rejected under 35 U.S.C. §102 (b) as being anticipated by Miles et al (U.S. Patent No. 4,335,017). Applicants respectfully traverse these rejections because Miles et al do not disclose "supported aerogels" as claimed by Applicants, but rather Miles et al disclose a deformable gel retained within the pore structure of a porous rigid support material, wherein the porous rigid support material is in the form of discrete porous particles having an interconnected pore structure (defined in US3,943,072, i.e., TiO_2 , Al_2O_3 , calcium phosphate and BaSO_4). (See Miles col. 1, lines 11-24 and Thompson col. 3, lines 63-68) Applicants claim a "support structure" as a material formed of glass or plastic fibers or stainless steel or kovar wire which is

coated with a substrate formed of aerogel, xerogel, or combinations thereof. Thus, the type of "supported gel material" the examiner cites from Miles et al is not of the type claimed by Applicants. In addition, Applicants have amended independent claims 1 and 13 to include the limitation that the apparatus is a "solid phase microextraction apparatus". Applicants respectfully submit that the rejection under 35 U.S.C. §102(b) should be withdrawn.

Claims 1, 3, 13-15 and 20 were rejected under 35 U.S.C. §102(b) as being anticipated by Lev et al (U.S. Patent No. 5, 643,447). Applicants respectfully traverse these rejections because Lev et al do not disclose "supported aerogels" as defined in Applicants' application, but rather Lev et al disclose "[a] planar chromatographic plate comprising a supported homogeneous thin porous film of ceramic material produced by sol-gel technology..." (See Lev et al col. 3, lines 28-30). Column 5, lines 33-35 of Lev et al states, "25 x 75 mm microscope slides were coated with 0.2 ml of fresh solution and dried overnight in ambient conditions." This is representative of the type of "supported gel material" that Lev et al disclose. Applicants define a "support structure" as a material formed of glass or plastic fibers or stainless steel or kovar wire which is coated with a substrate formed of aerogel, xerogel, or combinations thereof. (See Applicants specification page 5, lines 7-14). Applicants have amended independent claims 1 and 13 to include the limitation that the apparatus is a "solid phase microextraction apparatus". Applicants have amended claims 1 and 13 to include the limitation that the substrate, i.e., gel material, cover the entire perimeter of one end of the support structure. Coverage of the entire perimeter occurs when "[t]he support structure 20 is

placed or suspended in a container 22 with the aerogel precursor solution 24 to coat the end 26 of the structure 20. The coated fiber or wire 28 is then removed from solution and dried." (See Applicant's specification page 9, lines 16-21 and figures 2A and 2B) Applicants respectfully submit that the type of "supported gel material" the examiner cites from Lev et al is not of the type claimed by Applicants. Thus, the rejection under 35 U.S.C. §102(a) should be withdrawn.

Claims 1, 2, 5, 6, 9, 13-15 and 20 were rejected under 35 U.S.C. §102 (e) as being anticipated by Zare et al (U.S. Patent No. 6,136,187). Applicants respectfully traverse these rejections because Zare et al do not disclose "supported aerogels" as defined in Applicants' application, but rather Zare et al disclose "[a] porous sol-gel glass matrix attached to the inner wall of the separation channel" (See Zare, abstract). Applicants define a "support structure" as a material formed of glass or plastic fibers or stainless steel or kovar wire which is coated with a substrate formed of aerogel, xerogel, or combinations thereof. (See Applicants specification page 5, lines 7-14). Applicants have amended independent claims 1 and 13 to include the limitation that the apparatus is a "solid phase microextraction apparatus." Applicants have amended claims 1 and 13 to include the limitation that the substrate, i.e., gel material, cover the entire perimeter of one end of the support structure. Zare et al only discloses coverage of "an inner wall" not coverage of the entire perimeter of the separation channel, i.e., the support structure. Applicants respectfully submit that the type of "supported gel material" the examiner cites from Zare et al is not of the type claimed by Applicants. Thus, the rejection under 35 U.S.C. §102(a) should be withdrawn.

Rejections under 35 U.S.C. §103(a)

Claims 4, 12, 16, 17 and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hair et al, Miles et al, Lev et al or Zare et al. Applicants respectfully traverse these rejections because all of the claims rejected are dependant claims which depend from either amended independent claim 1 or amended independent claim 13 and thus contain all of those claim limitations. Claim 1 and claim 13 have both been amended to include the structural limitation that the apparatus be suitable for solid phase microextraction. Such an application is not suggested in the above cited references. Parameters cited by the examiner, such as the exact number of layers employed, the shape of the support, and the technique used to contact the support and coating material can materially affect the overall results of an apparatus used for a solid phase microextraction application. In addition, Claim 1 has been amended to include the structural limitation that the substrate, i.e., layer of gel material, coat the entire perimeter of the support structure. Such structural limitations are not suggested in the above cited references. Applicants respectfully submit that in light of the above amendments, the rejections under 35 U.S.C. §103(a) should be withdrawn.

Claim 7 was rejected under 35 U.S.C. §103(a) as being unpatentable over Lev et al in view of Zare et al. Applicants respectfully traverse this rejection because the claim rejected is a dependant claim which depends from amended independent claim 1 and thus contains all of that claim's limitations. Claim 1 has been amended to include the structural limitations that the substrate cover the entire perimeter of the support structure and that the apparatus be constructed for solid phase microextraction. Such

structural limitations are not suggested in the above cited references. Applicants respectfully submit that in light of the above amendments the rejections under 35 U.S.C. §103(a) should be withdrawn.

Claim 8 was rejected under 35 U.S.C. §103(a) as being unpatentable over Lev et al and Zare et al as applied above, and further in view of Miles et al. Applicants respectfully traverse this rejection because the claim rejected is a dependant claim which depends from amended independent claim 1 and thus contains all of that claim's limitations. Claim 1 has been amended to include the structural limitations that the substrate cover the entire perimeter of the support structure and that the apparatus be constructed for solid phase microextraction. Such structural limitations are not suggested in the above cited references. Applicants respectfully submit that in light of the above amendments, the rejections under 35 U.S.C. §103(a) should be withdrawn.

Note for the Record

Applicants acknowledge that the examiner has referenced Pawliszyn (U.S. Patent No. 5,691,206).

Conclusion

Reconsideration and allowance of claims 1-20 is respectfully requested. The Applicants respectfully submit that no new matter has been introduced by these amendments to the claims.

In the event that the Examiner finds any remaining impediment to the prompt allowance of these claims that could be clarified with a telephone conference, he is respectfully requested to initiate the same with the undersigned at (925) 422-6458.

Respectfully submitted,

Ann M. Lee

Ann M. Lee

Attorney for Applicant

Registration No. 47,741

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. (Amended) [A solid phase microextraction] An apparatus, comprising:

a support structure formed of a material selected from the group consisting of glass fibers, plastic fibers, stainless steel wire, and kovar wire; and

a sample collection substrate constructed for solid phase microextraction on the support structure, wherein the substrate covers the entire perimeter of one end of the support structure and [wherein] the substrate comprises a material selected from the group consisting of organic aerogels, inorganic aerogels, organic xerogels, inorganic xerogels, and combinations thereof.

13. (Amended) A method [forming a solid phase microextraction apparatus] comprising:

applying a layer of a gel precursor solution on at least [the] an end of a support structure, wherein the support structure is formed of a material selected from the group consisting of glass fibers, plastic fibers, stainless steel wire, and kovar wire and the substrate covers the entire perimeter of one end of the support structure; and

drying the layer to form a sample collection substrate constructed for use in a solid phase microextraction apparatus, wherein the substrate comprises a material selected from the group consisting of organic aerogels, inorganic aerogels, organic xerogels, inorganic xerogels, and combinations thereof.